



## Surface urban heat island across 419 global big cities

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**Year:** 2012  
**Journal:** Environmental Science & Technology. 46 (2): 696-703

### Abstract:

Urban heat island is among the most evident aspects of human impacts on the earth system. Here we assess the diurnal and seasonal variation of surface urban heat island intensity (SUHI) defined as the surface temperature difference between urban area and suburban area measured from the MODIS. Differences in SUHI are analyzed across 419 global big cities, and we assess several potential biophysical and socio-economic driving factors. Across the big cities, we show that the average annual daytime SUHI ( $1.5 \pm 1.2$  °C) is higher than the annual nighttime SUHI ( $1.1 \pm 0.5$  °C) ( $P < 0.001$ ). But no correlation is found between daytime and nighttime SUHI across big cities ( $P$  Euro Surveillance (Bulletin Européen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.84), suggesting different driving mechanisms between day and night. The distribution of nighttime SUHI correlates positively with the difference in albedo and nighttime light between urban area and suburban area, while the distribution of daytime SUHI correlates negatively across cities with the difference of vegetation cover and activity between urban and suburban areas. Our results emphasize the key role of vegetation feedbacks in attenuating SUHI of big cities during the day, in particular during the growing season, further highlighting that increasing urban vegetation cover could be one effective way to mitigate the urban heat island effect. © 2011 American Chemical Society.

**Source:** <http://dx.doi.org/10.1021/es2030438>

### Resource Description

#### Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Temperature

**Temperature:** Fluctuations

#### Geographic Feature:

resource focuses on specific type of geography

Urban

#### Geographic Location:

resource focuses on specific location

# Climate Change and Human Health Literature Portal

Global or Unspecified

## Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

## Resource Type:

format or standard characteristic of resource

Policy/Opinion

## Timescale:

time period studied

Time Scale Unspecified